Challenge: Measure the needed dimensions of the object provided, knowing that you will be recreating this object as a dimensioned solid model in a related homework assignment.

Student Learning Outcomes:

1) Develop ability to use dimensional measurement tools (instruments) rulers, calipers and micrometers
2) Identify resolution of each dimensional tool
3) Report percent differences

Pre-lab:

- Familiarize yourself with how to use a standard ruler, a caliper, and a micrometer.
    - In iLearn you will find practice guides, user manuals, and/or video links
    - You may also use web based open resources to aid your work
- You must provide information on resources (those provided and ones you locate), using proper citation, when writing up your Challenge Report.
- If you are NOT using a resource, because you have prior experience with an instrument, provide discussion of your background expertise.
- Be prepared to write a brief description of the process steps you use to conduct the measurements.

Lab Guidance:

- You will be deciding what dimensional measurements of the object's features that you will need to make while in lab.

- Prepare an Excel spreadsheet with five distinct repeat readings of each required dimension, using two distinct instruments (ruler and Vernier caliper OR ruler and digital caliper). Be sure to indicate UNITS!

    For example:

Object	Dimension	Instrument 1	Instrument 2
		Reading 1	Reading 1
		…	…
		Reading 5	Reading 5

- Alternate use of the instruments (read dimension 1 using instrument 1, reset the instrument to zero THEN read dimension 1 using instrument 2, etc)

Data Analysis:

- In the spreadsheet, calculate the mean and the standard deviation for each dimension from the five readings entered for each instrument.
- Determine the percent difference between readings on a given dimension using the two instruments.

Deliverables:

Upload the Challenge Report by the deadline, uploading to iLearn as two files

(a) Fully annotated spreadsheet file:

Provide a spreadsheet file in Excel to document your raw data and your data analysis

Be sure to use text blocks in the Excel file to annotate your work

For example, if you are using a formula, show the formula

(b) Working Notes (PDF).

Document your procedures in a Working Notes file, uploaded as a PDF.

Show photos and/or sketches of your work

Provide written notes of how you did the work

Include observations of your work such as if you had difficulty with something, what did you do to resolve the issue, what kinds of troubleshooting did you undertake, etc

Provide a summary of your data analysis

Provide conclusions you make based on the data